As regards the principal effect, reduction of blood pressure, the activity (extent of reduction) of the various nitrites takes the following order when equal volumes are administered to animals by inhalation:—(1) secondary propyl; (2) tertiary butyl; (3) secondary butyl, (4) isobutyl, nearly equal; (5) tertiary amyl; (6) α-amyl, (7) β-amyl, nearly equal; (8) methyl; (9) butyl; (10) ethyl; (11) propyl.

The order is somewhat modified when the nitrites are given by intra-vascular injection. When the duration of the sub-normal pressure is considered, the order is nearly the reverse of that given above, the effect of methyl nitrite being the last, and that of secondary propyl nitrite one of the first, to disappear. In contrasting the results of the measurement of pulse acceleration produced by these nitrites, it is noticed that their activity in this respect does not follow the same order as that in reducing blood pressure, the amyl nitrites in particular occupying a higher position in the table. The causes of these differences will be considered in the second part of this paper, in conjunction with a discussion of the relation of the chemical constitution of the nitrites to the physiological effects now described, and also to those produced in striated muscle, a description of which will form part of the subsequent communication.

In order that the physiological data might be placed on an absolutely satisfactory basis for chemical discussion, we determined at the commencement of last year to repeat all the more important physiological experiments. This necessitated the labour of preparing fresh specimens of the nitrites. The results of these confirmatory experiments have been in every respect satisfactory, since they differed in no important respect from those previously obtained.

The chemical part of this enquiry has been conducted in the Research Laboratory of the Pharmaceutical Society, in London, whilst the physiological experiments have been made in the Pharmacological Laboratory of the University of Aberdeen.

V. "Some Points in the Structure and Development of Dentine." By J. Howard Mummery. Communicated by C. S. Tomes, F.R.S. Received February 7, 1891.

(Abstract.)

The purpose of the present paper is to show that there are appearances in dentine which suggest that it is formed by a connective tissue calcification, and that the process is more closely analogous to the formation of bone than has usually been supposed.

The varied theories held as to the structure and development of

dentine are partly due to the difficulties met with in the investigation of this tissue, soft and hard parts having to be retained in their natural relations to each other. Decalcification of the dentine by acids has been resorted to, a mode of preparing microscopical objects for study which is open to many objections. Sections cut by a process recommended by Dr. L. A. Weil, of Munich, exhibit the natural relations of pulp and tooth without the necessity of resorting to decalcification. Fresh specimens are fixed in sublimate, passed through gradually increasing strengths of spirit to absolute alcohol, and slowly impregnated with a solution of desiccated balsam in chloroform, dried with more balsam over a water-bath, and cut down on a stone with water. The present investigation was undertaken with the aid of this process, controlled by the examination of other specimens cut by the more ordinary methods.

Processes or bundles of fibres are seen, incorporated on the one side with the dentine, and on the other with the connective tissue stroma of the pulp; some of the bundles give evidence of partial calcification, reminding one of similar appearances in the calcification of membrane bone. Cells are seen included in the bundles and lying parallel to their course; these cells, it is concluded, form together with the odontoblasts the formative cells of the dentine, the calcification of which tissue should be looked upon as in part, at least, a secretion rather than a conversion process, the cells secreting a material which calcifies along the lines of and among the connective tissue fibres, the cells themselves not being converted into dentine matrix. These appearances are seen in the rapidly forming dentine of a growing tooth, as well as in more fully developed specimens. An examination of other Mammalian teeth reveals similar appearances. The dentine of the incisor of the Rat (*Mus decumanus*) shows with great distinctness the incorporation of the connective tissue fibres with the dentine, and there is a marked striation of the dentine near the pulp cavity, parallel with these fibres. The ivory of the Elephant's tusk shows the same relation of connective tissue to formed dentine. Vaso-dentine exhibits a very well defined connective tissue layer surrounding the pulp. This layer has hitherto been looked upon as consisting of odontoblasts, but this tissue shows no nuclei, and has the characters of a layer of flattened connective tissue fibres—a layer of nucleated cells in close apposition to the dentine, probably being the real odontoblasts of vaso-dentine.